

Somewhere Over the Rainbow: Potential Futures for DAST Research

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Some areas examined in drawing types of tests:

- perceptions of scientists, perceptions of engineers, perceptions of environments (out of doors) or environmental stewards, drawing of classrooms – to investigate classroom organization, layouts, etc. , draw a computer scientist, drawing of mental maps outdoors (place-based pedagogy out of cognitive psychology), natural phenomena (such as geologic features, etc.), drawing of informal science.

Focus Questions

1. What “other” things do we want to know about DAST than what has already been reported in the research literature?
 - At what age(s) do conceptions of scientists tend to develop?
 - Historical empathy – connections of what is in drawings as a consequence of the historical times in which they were drawn?
 - Cross-cultural influences effects on drawings
 - Utilization of different types of scoring guides/rubrics for analyzing drawings
2. What aspects of a particular influence (media, school, parents, etc.) relative to perceptions of scientists need to be examined — if any?
 - *Science Communications* research, particularly about icons
 - Human cognition research – to better unpack what the drawings may actually mean
3. How do we find out how a particular influence impacts students (cognitively, affectively)? And what is happening when this occurs?
 - Importance of including interviews with the drawings to help researcher dig deeper to find out what the student was trying to address in his/her drawing – need to ask students not only what they drew, but why they drew it. If you had more time, what else would you draw? (Cognitive psychology)
 - Look at relationship of sizes and positions of elements in the drawings
4. Is there a conceptual framework that can serve as a guiding rubric for continued DAST-related research — if so, what is it (or what are they)? -- particularly as this relates to conceptual change?
 - Question remained largely undiscussed, but brief consensus was that this would be a welcome addition for guidance. Vosniadou’s model of conceptual development was suggested as such a framework.

Framework Theory – Stella Vosniadou – some selected references:

Vosniadou, S. (2007a). Conceptual change and education. *Human Development*, 50, 47-54.

- Vosniadou, S. (2007b). The cognitive-situative divide and the problem of conceptual change. *Educational Psychologist*, 42(1), 55-66.
- Vosniadou, S. (2007c). From conceptual development to science education: A psychological point of view. *International Journal of Science Education*, 20(10), 1213-1230.
- Vosniadou, S. (2002a). Exploring the relationships between conceptual change and intentional learning. in G.M. Sinatra & P.R. Pintrich (Eds.). *Intentional Conceptual Change*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Vosniadou, S. (2002b). Mental models in conceptual development. In L. Magnani & N. Nersessian (Eds). *Model-Based Reasoning: Science, Technology, Values*. New York: Kluwer Academic Press.
- Vosniadou, S. (2002c). On the nature of naïve physics. In M. Limon & L. Mason (Eds.), *Reconsidering conceptual change: Issues in theory and practice* (pp 61-76). Dordrecht: Kluwer.
- Vosniadou, S. (2001). *How children learn*. Geneva, Switzerland: International Academy of Education, International Bureau of Education.
- Vosniadou, S. (1994). Capturing and modeling the process of conceptual change. *Learning and Instruction*, 4, 45-69.

Journal: *Public Understanding of Science* – selected articles relative to DAST or images of scientists

- Flicker, E. (2003). Between brains and breasts – women scientists in fiction film: On the marginalization and sexualization of scientific competence. *Public Understanding of Science*, 12, 307-318. DOI: 10.1177/0963662503123009.
- Haynes, R. (2003). From alchemy to artificial intelligence: Stereotypes of the scientist in Western literature. *Public Understanding of Science*, 12, 243-253. DOI: 10.1177/0963662503123003.
- Kirby, D.A. (2003). Scientists on the set: Science consultants and the communicating of science in visual film. *Public Understanding of Science*, 12, 261-278. DOI: 10.1177/0963662503123005.
- Locke, S. (2005). Fantastically reasonable: Ambivalence in the representation of science and technology in super-hero comics. *Public Understanding of Science*, 14, 25-46. DOI: 10.1177/0963662505048197.
- Rose, C. (2003). How to teach biology using the movie science of cloning people, resurrecting the dead, and combining flies and humans. *Public Understanding of Science*, 12, 289-296. DOI: 10.1177/0963662503123007.
- Rosenstone, R.A. (2003). Comments on science in the visual media. *Public Understanding of Science*, 12, 335-339. DOI: 10.1177/0963662503123011.

- Steinke, J. (2005). Cultural representations of gender and science: Portrayals of female scientists and engineers in popular films. *Science Communication*, 27(1), 27-63. DOI: 10.1177/1075547005278610.
- Steinke, J., Lapinski, M.K., Crocker, N., Zietsman-Thomas, A., Williams, Y., Evergreen, S.H., & Kuchibhotla, S. (2007). Assessing media influences on middle school-aged children's perceptions of women in science using the Draw-A-Scientist Test (DAST). *Science Communication*, 29(1), 35-64. DOI: 10.1177/1075547007306508.
- Tapscott, D. (2009). Grown up digital. How the net generation is changing your world. New York: McGraw Hill.
- Weingart, P., & Pansegrau, P. (2003). Introduction: Perception and representation of science in literature and fiction film. *Public Understanding of Science*, 12, 227-228. DOI: 10.1177/0963662503123001.